

What is claimed is:

- 1     1.     A method of producing semiconductor devices to decrease diffusive  
2     damage effects to a primary structure, comprising the steps of:  
3         determining an active diffusion volume within which the primary  
4     structure is disposed; and  
5         disposing a redundant structure within the active diffusion volume  
6     adapted to share a select redundancy characteristic with the primary  
7     structure.

2. The method of claim 1 wherein the step of disposing a redundant structure further comprises selectively disposing one or more redundant structures.

3. The method of claim 2 further comprising the steps of:  
calculating, based on the active diffusion volume, a potential diffusive damage to the primary structure;  
determining, based on the potential diffusive damage, a desired number of redundant structures to be disposed; and  
disposing the desired number of redundant structures within the active diffusion volume.

4. The method of claim 1 wherein the select redundancy characteristic is diffusive redundancy only.

5. The method of claim 1 wherein the select redundancy characteristic is electrical redundancy.

6. The method of claim 3 wherein the select redundancy characteristic is diffusive redundancy only.

7. The method of claim 3 wherein the select redundancy characteristic is electrical redundancy.

8. The method of claim 3 further comprising the step of determining a desired geometric orientation of the desired number of redundant

structures with respect to the primary structure.

1     9.    A method of producing a semiconductor device having a copper-based,  
2    dual-damascene structure, comprising the steps of:  
3         determining an active diffusion volume within which the dual-  
4    damascene structure is disposed; and  
5         disposing a redundant structure within the active diffusion volume  
6    adapted to share a select redundancy characteristic with the dual-  
7    damascene structure.

10. The method of claim 9 wherein the step of disposing a redundant structure further comprises selectively disposing one or more redundant structures.

11. The method of claim 10 further comprising the steps of:  
calculating, based on the active diffusion volume, a potential diffusive damage to the dual-damascene structure;  
determining, based on the potential diffusive damage, a desired number of redundant structures to be disposed; and  
disposing the desired number of redundant structures within the active diffusion volume.

12. The method of claim 9 wherein the select redundancy characteristic is diffusive redundancy only.

13. The method of claim 9 wherein the select redundancy characteristic is electrical redundancy.

14. The method of claim 11 further comprising the step of determining a desired geometric orientation of the desired number of redundant structures with respect to the dual-damascene structure.

1     15.   A semiconductor device structure comprising:  
2           a first metallic interconnect;  
3           a second metallic interconnect;  
4           a primary via structure, disposed between and electrically  
5   intercoupling the first and second metallic interconnects; and  
6           a buffer structure, disposed upon the first metallic interconnect in  
7   proximity to the primary via structure, and adapted to buffer the primary  
8   via structure from diffusive voiding occurring at a contact point between  
9   the primary via structure and the first metallic interconnect.

16. The structure of claim 15 wherein the second metallic interconnect and the primary via structure are copper-based dual damascene structures.

17. The structure of claim 15 wherein the buffer structure comprises a second via structure, disposed between and electrically intercoupling the first and second metallic interconnects.

18. The structure of claim 15 wherein the buffer structure comprises a second, electrically inactive, via structure, disposed upon the first metallic interconnect proximal to the primary via structure.

19. The structure of claim 18 wherein the buffer structure comprises an electrically inactive structure disposed upon the first metallic interconnect to immediately and completely surrounding the primary via structure.

20. The structure of claim 15 wherein the buffer structure comprises:  
a second via structure, disposed between and electrically intercoupling the first and second metallic interconnects; and  
a third, electrically inactive, via structure, disposed upon the first metallic interconnect proximal to the primary via structure.